After all, Miss Kingsley's little jokes are lively reading, and they will afford jaded examiners many a laugh years hence, when they appear as solemn assertions taught by the intelligent teacher who "read them in a book of travels." The collection of eighteen species of reptiles and sixty-five species of fishes, brought home from the Ogowé and other rarely visited regions, form a solid contribution to science, no less than sixteen of the fishes being new. These are described in an appendix by Dr. Günther, reprinted from the *Annals and Magazine of Natural History*. Mr. W. F. Kirby also describes eight new species of insects, and catalogues a considerable number.

The narrative touches lightly on the voyage out, gives lively notes of the condition of nature and man in Sierra Leone, the Gold Coast, Lagos and Fernando Po, and then proceeds to give a detailed account of two expeditions which are perhaps the most remarkable ever made by a white woman in equatorial Africa. The first of these includes a description of French Congo, a voyage up the Ogowé in river-steamer and canoe to the borders of Ashongo-land, made famous thirty-five years ago by Paul du Chaillu, where Miss Kingsley was fortunate enough to see gorillas in their natural surroundings. From the Ogowé she made a daring, in fact, considering her report, a reckless journey through the country of the cannibal Fans, accompanied only by natives, and occasionally wading swamps "up to the chin in water" until she emerged on the Gabun estuary. Next came a short but interesting visit to Corisco Island, a Spanish possession; and the last exploit recorded was the climbing of Great Cameroons Peak (13,760 feet) in the German Protectorate, a feat which Miss Kingsley says she was "the third Englishman" to accomplish. The description of the climb is full of interest.

The chapters on fetish, and the long appendix on trade and labour in West Africa are of real value, and, being more serious in their style than the narrative, details may be accepted with some confidence. The literature of fetish lore on the West Coast of Africa is already by no means inconsiderable; and Miss Kingsley applied herself diligently to the task of extending it. She acknowledges great assistance from white residents on the coast, especially from the veteran missionary, Dr. Nassau, who has lived in West Africa since 1851; but she also got much information directly from the natives.

The doctrine of the multiple soul among the Calabar negroes is very well described. These souls are four—the soul that survives death, the shadow on the path, the dream soul, and the bush soul. The bush soul is detachable from the body, but if damaged or killed on its wanderings the body suffers the same fate. Hence old people are held in respect, even if known to be wicked, because their bush souls must be particularly powerful and astute. The soul that survives death is liable to reincarnation either in a higher or lower form. The dream soul is the particular care of witches, who lay traps for it, and return it to the owner on payment. Miss Kingsley believes that common-sense underlies many even of the most revolting fetish customs; for example, the custom of killing the wives of a chief on his death is a safeguard against poison being mixed in his food while he is alive. No trace of sun-worship was detected, nor did tree-worship appear to explain many of the fetish beliefs. An instructive contrast is drawn between the beliefs and customs of the pure negroes of Upper Guinea, and the people of Bantu affinities in the Congo and Ogowé Basins.

The relation of the African native to civilising influences is fully considered. Miss Kingsley, in spite of her frank admiration of the noble characters of the missionaries she met, believes that they are working in an entirely wrong direction, and are responsible for producing many of the evils they try to cure. She considers that missionary teaching develops the emotional parts of a black man's character, which were originally in excess, and does nothing for his industrial powers, which are naturally very feeble. She approves of teaching the natives to work in plantations and at trades actually useful to them in their present style of life, rather than teaching them to read and to become printers, bookbinders, and the like. She would not interfere with polygamy or domestic slavery, both these institutions being in many ways necessary to the negro, and not necessarily retarding his progress in civilisation. With regard to the drink traffic, she shares the official view that the West Coast African is not particularly intemperate, a large part of the imported liquor being sent far into the interior as payment for trade-goods, and a certain proportion being poured away as fetish offerings. Alcohol she holds to be necessary for the preservation of health in the swamps during the rainy season, and trade-gin appeared to be far less deleterious than the native palm-wine.

NOTES

M. VIOLLE has been elected a member of the Section de Physique of the Paris Academy of Sciences, in succession to the late M. Fizeau.

PROF. W. RAMSAY has been elected a corresponding member of the Royal Academy of Bohemia, and also of the Academy of Sciences of Turin.

ON April 21, Sir Archibald Geikie will commence the course of six lectures which he has been invited to deliver at the Johns Hopkins University, Baltimore, on the principles of geology.

THE desirability of holding an International Congress of Mathematicians has been for some time past widely felt, and we are glad to announce that the project is now about to be realised. A Committee has been formed for the purpose of organising a Congress, to be held in Zürich on August 9, 10, and 11, 1897, in which mathematicians from all parts of the world are invited to participate. The Committee includes the following names:—H. Bleuler and H. Burkhardt (Zürich), L. Cremona (Rome), G. Dumas, J. Franel, and C. F. Geiser (Zürich), A. G. Greenhill (Woolwich), A. Hertzog (Zürich), G. W. Hill (West Nyack, U.S.A.), A. Hurwitz (Zürich), F. Klein (Göttingen), A. Markoff (St. Petersburg), F. Mertens (Vienna), H. Minkowski (Zürich), G. Mittag-Leffler (Stockholm), G. Oltramare (Geneva), H. Poincaré (Paris), J. Rebstein and F. Rudio (Zürich), K. Vondermühl (Basle), and F. H. Weber (Zürich). All communications or inquiries relative to the Congress are to be addressed to Prof. Geiser, Küsnacht-Zürich. It is confidently expected that a large number of mathematicians will attend the Conference.

PROF. LOEFFLER, of Greifswald, and Dr. Frosch, assistant at the Koch Institute, have, says the *British Medical Journal*, been entrusted with the inquiry into the foot and mouth disease, for which a sum of 20,000 marks (1000*l.*) has been voted by the German Government.

WE regret to have to record the following deaths:—Mr. Henry Charles Forde, a member of the Council of the Institution of Electrical Engineers, and connected for many years with the construction and laying of submarine cables; Major Charles E. Bendire, honorary curator of the Department of Oology in the U.S. National Museum; Dr. Bernhard Lundgren, Professor of Geology in the University of Lund.

IN consequence of the growing importance of carbide of calcium, and the fact that the mere contact of moisture with this material causes a dangerous evolution of acetylene, the Home Secretary has caused inquiries to be made into the subject, with the result that an Order in Council has been made, bringing carbide of calcium within the operation of the Petroleum Act. Accordingly, from the date on which the Order comes into force—viz. April 1—only holders of a licence under the Petroleum Act may lawfully keep carbide of calcium.

WE learn from the *Lancet*, that the German Commission for the study of the plague will leave Germany for India in a few days. The members are Prof. Koch, Prof. Pfeiffer (of the Institution for Infectious Diseases), Prof. Gaffky (of Giessen), Dr. Disuderic and Dr. Sticker (of the Imperial Health Office). Prof. Koch will travel direct to Bombay on the completion of his investigations in South Africa, and till his arrival the leader of the Commission will be Prof. Gaffky, who was with Prof. Koch in British India during the great cholera epidemic of 1884, and assisted him in the researches which finally led to the discovery of the comma bacillus.

MR. POULETT WEATHERLEY, who has for some years been travelling in Central Africa, has recently explored Lake Bangweolo. We learn from the *British Central Africa Gazette* that Mr. Weatherley has completed the circumnavigation of the lake, and has taken a number of careful sextant observations. His opinion is that M. Giraud's survey of the lake is a little faulty. Mr. Weatherley visited the tree under which Livingstone's heart is buried at Old Chitambo. He remarks:—"It is a thousand pities that some attempt is not made by people at home, who are interested in Livingstone and his work in Africa, to prevent the exact spot where he died from being hopelessly lost sight of, as it will be in a very few years. When the poor old Mpundu tree falls through fire and decay—it is now fast becoming a mere shell—after having kept guard so faithfully all these years—a quarter of a century now—there is nothing to replace it. Nothing could possibly be more appropriate than the simple rugged tree standing over the spot; no monument could be more inexpressibly solemn, but, unfortunately, it cannot last for ever. The Mpundu must go, and with it, unless prompt steps are taken, goes the knowledge of the site of Livingstone's last halting-place."

IN a paper read before the Royal Botanic Society on Saturday last, Mr. William Martindale, a member of the Council, advocated the establishment by the Society, in their gardens, of an institute for the teaching of botany, which, he suggested, should be similar to the institutes on the continent. He urged that the institute would be of vast importance to colonists and emigrants, who now went to Germany in considerable numbers for instruction. He also stated that the medical and pharmaceutical schools would doubtless supply the institute with many of its students. In the discussion which followed the reading of the paper, Dr. Scott said it was an extraordinary anomaly that not one institution which taught botany in London had a botanic garden. He expressed his entire sympathy with the proposal. Prof. Oliver also spoke in favour of the proposed institution, which, he said, would be welcomed by all the botanists in London. Several other botanists expressed their appreciation of the scheme.

AN interesting lecture was recently delivered before the Sheffield Society of Engineers and Metallurgists, by Mr. Thomas Andrews, F.R.S. For some time Mr. Andrews has studied the various aspects of the loss of strength in iron and steel by reason of use. He has made exhaustive microscopical chemical and physical examination of rails of known age and condition of service on main lines of railway, and has thus obtained much valuable information on the subject. In the course of his remarks, Mr. Andrews showed the difference between the loss of strength from mechanical abrasion and the deterioration of the ultimate crystalline structure of the metal under the fatigue of stress consequent on the presence of internal micro-flaws. He also demonstrated the effect of low temperature in reducing the impact resistance of rails, the influences of corrosion, and the manner in which vibratory stress induced microscopic internal growing flaws in rails. Allusion was made to the influence of various kinds of ballast on the permanent way. The lecturer compared the structure of old rails of long service with that of modern ones, and pointed to the sources of weakness, at the same time indicating the structure best calculated to yield the most durable and safe results. Mr. Andrews expressed a hope that the labours of the Royal Commission on the loss of strength in steel rails would result in a general improvement in the quality and trustworthiness of the metal.

WE have several times called attention to Dr. G. Folgheraiter's interesting observations on the magnetisation of Etruscan vases. Hitherto there has been a slight uncertainty as to whether the magnetisation may not have undergone some modification during the many centuries that have elapsed since these vases were baked. In his latest contribution to the *Atti dei Lincei*, Dr. Folgheraiter dispels any doubts on the matter by his observations on some vases which were pieced together from scattered fragments, discovered in excavations at Arezzo. If the magnetisation of the *terra-cotta* had in any way altered since they were broken, it is clear that the different portions would have been differently affected, and the mended vases would have shown somewhat irregular magnetisation. So far from this being the case, they were found to be as regularly magnetised as those which had been excavated entire, the opposite poles at the mouth and base being exactly 180° apart. The only remaining element of uncertainty is what was the orientation of the vases in the kiln; and Dr. Folgheraiter hopes that further excavations may lead to the discovery of potteries of the Etruscan epoch containing vases *in situ*. Should he be successful, we may look forward to exact determinations of the magnetic elements, which will greatly add to our knowledge of terrestrial magnetism.

DR. JULIUS PRECHT, of Heidelberg, has just published an important thesis on the kathodic rays, Röntgen rays, and other radiations emanating from vacuum tubes; which confirms the view that these rays are of a highly complex nature. Besides the rays capable of being deflected by a magnet according to the law of Biot and Savart (which the author has verified by photography), Röntgen's, Goldstein's, and Lenard's rays are shown to be distinguishable by their chemical and photographic effects. Dr. Precht considers that a portion of the radiation from a discharge tube is not a wave-motion, because the absorption of the rays in passing through paper varies with the time of duration of the radiation: it is suggested that this portion may be electric in its nature. Interference phenomena were obtained with direct and reflected Röntgen rays, and from these their wave-length was found to range from 370×10^{-6} to 830×10^{-6} mm.; and observing that transverse light-waves of this length cannot pass through black paper, the author seems to incline to the theory of longitudinal waves. By such interference experiments, wave-lengths were obtained nearly twice and four times as great as those found by Voller in observing the diffraction produced through a slit.

WHY is it that a dietary consisting entirely of cereals and preserved meat induces the symptoms of scurvy? Dr. A. E. Wright, professor of pathology in the Army Medical School, Netley, has lately discussed the facts bearing upon this question, and he concludes that scurvy is really a condition of acid-intoxication. This theory seems to be supported by the experience of explorers and others who have had to contend with scurvy. There are only three methods which have been definitely shown to exert an influence in warding off and ameliorating the scorbutic condition. Each of these methods consists essentially in the administration of an alkaline food-stuff (blood, fresh vegetables, and lime-juice all come under this denomination). Of each of these methods it may, therefore, be asserted that it is a method which is calculated to ward off and ameliorate a condition of acid-intoxication. Though fresh vegetables and lime-juice are used as remedies for scurvy, both of them are very slow in their action, and Dr. Wright shows that much better remedial agents are alkaline salts, such as carbonate of soda or carbonate of potash. A variety of other salts are available for the purpose; for instance, either the citrate or the acetate, or the lactate, of soda and potash, or, better still, the neutral tartrate of soda and potash. Inasmuch as the remedial agents suggested by Dr. Wright are inexpensive and eminently portable, explorers and navigators should make use of them.

IN the *Annali dell' Ufficio Centrale di Meteorologia*, vol. xvii., Messrs. A. Riccò and G. Saija have discussed at considerable length the meteorology of Mount Etna Observatory, situated at a height of 9650 feet above the level of the sea, on the southern edge of the central crater. Although the observations only cover a period of five years, and are not quite continuous, the results obtained from this peculiar locality are interesting from several points of view, and illustrate the difficulties met with at such elevated stations. During the summer season the observatory is reached from Catania after a ride of about seven hours on mules, but in winter the snow will not bear the weight of the mules; when snow is falling the observers have to use a compass, as all trace of the path is obliterated. To obviate the impossibility of living at the observatory all through the winter, a self-recording meteorograph, by Richard Brothers, which under favourable circumstances acts for forty days, has been erected by the Central Office. For more than six months of the year the monthly means of the shade temperature are below the freezing point, and this low temperature is sometimes recorded in the summer season. The absolute maximum observed was 66·4°, and the minimum, 8·1°. The diminution of temperature with height is, upon an average, 1° for each 328 feet. The amount and frequency of rainfall, &c., are less than in the plain, the number of days being on an average only thirty-seven yearly, of which six are days of rain, the remainder being of snow, or sleet.

As a preface to the *Weekly Weather Report* for the year 1895, the Meteorological Council have just issued a valuable series of mean values deduced from the observations obtained from a large number of stations. The tables show (1) the monthly and yearly results of the daily maximum and minimum temperatures for the twenty-five years 1871–95; (2) the mean rainfall for each month and for the year, for the thirty years 1866–95; and (3) the mean monthly and yearly duration of sunshine for the fifteen years 1881–95. The values are issued in continuation of those published in the preface to the *Weekly Weather Report* for 1891, and supply very useful information relating to the climatology of the British Islands for the periods in question. In the preparation of the data, the observations at the stations of the Meteorological Council have been supplemented, to some extent, by those under the control of the Royal Meteorological Society and the Scottish Meteorological Society. These tables have been supplemented by another series referring to those stations contained in the *Daily Weather Report*, and giving additional information, showing the mean values of barometric pressure for each month and for the year, during the same period, together with the absolute extremes of the daily maximum and minimum temperatures. The highest summer temperatures occur mostly in July, at times reaching 90° at several places, the maximum being 96° in London in August 1876. The lowest temperature recorded in this latter series is – 5° at Loughborough, in the Midland Counties, in February 1895. The dryest station is Spurn Head, with an annual rainfall of 20·6 inches; in London the yearly average is 24·8 inches. The greatest amount of sunshine occurs in May; the south-west of England is the sunniest part, on the yearly average, while London only enjoys 25 per cent. of the possible amount.

WE have received from the Geological Survey of Alabama the first part of a Report on the Valley Regions of Alabama. It deals with the geology and economic resources of the Tennessee Valley region, is illustrated by nine photographs, and contains numerous chemical analyses of ores.

THE current number of *Brain* (Part lxxvi.) contains a paper by Dr. A. D. Waller, F.R.S., upon the action of anæsthetics, sedatives, and narcotics upon isolated nerve, with forty-three illustrations showing the effect of various drugs upon nerves. Each of these interesting records is thus a trustworthy autobiographical episode related by the nerve itself.

IN a pamphlet entitled "La Piscifacture Marine," published by the Institut International de Bibliographie Scientifique, Dr. Marcel Baudouin gives an account of the hatcheries for marine fishes in the United States, Canada, Floedevig (Norway) and Dunbar, and pleads for the establishment of similar institutions on the French coast.

WE have received two publications of the U.S. Department of Agriculture:—"Contributions from the U.S. National Herbarium, Vol. v. No. 1," consists of a General Report, by Mr. John B. Leiberg, on a Botanical Survey of the Cœur d'Alene Mountains in Idaho during the summer of 1895. "Bulletin No. 4" of the Division of Agrostology is devoted to a number of papers, by different writers, entitled "Studies in American Grasses."

IN Part ix. of the *Minnesota Botanical Studies* for 1896, Miss Josephine S. Tilden points out an interesting connection between the rare and little known fresh-water alga *Pilinia diluta*, found on wet rocks, and *Stigeoclonium flagelliferum*, of which it appears to be a peculiar form, dependent on vital conditions. Mr. B. Fink describes the mode of pollination of the tomato, which is effected by bees in search of pollen. Mr. F. Ramaley describes certain points in the anatomy of the stem of the Onagraceæ.

IT would be difficult to produce a better short popular account of the discovery of *Pithecanthropus erectus*, by Dr. Dubois, than is contributed to the March number of the *English Illustrated Magazine* by W. K. Marischal. The illustrations are very instructive, and the brief text will be easily understood by the general reader. Another article in the same magazine is of the Jules Verne type, and purports to give an account of communications with Mars and journeys through space in an air-ship.

TH. THORODDSEN's detailed history of the geography of Iceland has been translated into German by Dr. August Gebhardt. The first part of the work, dealing with the geographical history up to the end of the sixteenth century, has just been published by B. G. Teubner, Leipzig, under the title "Geschichte der Isländischen Geographie." During the past sixteen years Mr. Thoroddsen has been systematically exploring Iceland, and accumulating material for his work, a review of which will be more satisfactorily given when the completed results of his bibliographical and geographical surveys are before us.

NEW editions of several scientific works have come to hand within the past few days. Mr. W. B. Tegetmeier's work on "Pheasants, their Natural History and Practical Management" (London: Horace Cox) has developed into a third enlarged edition. The book contains a very useful account of the natural history, habits, food, and treatment of the various species of pheasants.—Prof. Strasburger's standard work, "Das Botanische Practicum" (Jena: Gustav Fischer), is known to all botanists as an admirable book for the laboratory and the library. It first appeared in 1884, and was reviewed in NATURE shortly after publication (vol. xxx. p. 215). The original volume consisted of six hundred pages; the present edition (the third) runs into 739 pages, the increase of size being made necessary by the many additions to the knowledge of the minute structure of plants during the past twelve years. Prof. Strasburger's "Practicum" became indispensable to the botanical laboratory as soon as it appeared, and the third enlarged and revised edition of it will maintain the position gained by the first.—The fourth edition has been published of Prof. Henry Adams's "Handbook for Mechanical Engineers" (London: E. and F. N. Spon). The book is a collection of notes, definitions, and formulæ, to which ready reference is often required for examination purposes and in general practice.—Messrs. John Wiley and Son, New York, have issued a third edition of "Retaining-Walls for Earth," by Prof. Malverd A. Howe. The book includes the theory of earth-pressure as developed from the ellipse of stress, and a short treatise on foundations, illustrated with examples from practice.—Mr. Edward Stanford has published new editions of three little books by Mr. W. Thynne Lynn. The books are "Celestial Motions" (ninth edition), "Remarkable Comets" (fifth edition), and "Remarkable Eclipses" (second edition). They are so readable and accurate that they thoroughly deserve to be successful.

THE concluding part of a most valuable collection of physical tables has just been issued by the Smithsonian Institution. The work has grown out of a series of meteorological tables compiled by Dr. Arnold Guyot, and first published in 1852. These tables proved so serviceable, and there was such a large demand for them, that when the question of revision for a fifth edition arose, Prof. Langley decided to have an entirely new publication prepared. The first part of the new series (the Meteorological Tables) appeared in 1893; the second volume (the Geographical Tables) was published in 1894; and now we have the Physical Tables, to complete the work, which forms the concluding part of vol. xxxv. of the Smithsonian Miscellaneous Collections. The present volume of tables has been prepared by Prof. Thomas Gray, of the Rose Polytechnic Institute, Terre Haute, Indiana. There are altogether 315 tables of data, referring to all branches of physical inquiry. The tables are well arranged; they have also been carefully selected from the works of well-known investigators, and, as a result, they are easy of reference and can be trusted. One of the many excellent points presented by them is that the authorities from which the physical data have been derived are quoted as foot-notes to the tables. It is thus easy to find the paper or memoir from which the results are taken. A few mathematical tables are included, but only those which are useful to physicists, and which are not easily found elsewhere. Physical chemists may confidently go to the volume for data needed by them, and every one engaged in electrical research will prove the value of Prof. Gray's work. The volume is, indeed, full of facts which investigators often have to spend hours in finding; it is a compendium which no physical laboratory where serious work is done can dispense with. Physicists will be grateful to Prof. Gray for so carefully compiling these tables, and to the Smithsonian Institution for publishing them. The brief introduction on units of measurement and conversion factors will be of assistance to students using the tables.

AN experimental study of an interesting case of chemical equilibrium is contributed by M. Pélabon to the *Comptes rendus* of the Paris Academy of Sciences (February 15). When hydrogen and selenium are heated together for some time, hydrogen selenide is formed; a state of equilibrium being finally reached in which the proportions of hydrogen, selenium, and hydrogen selenide are unchanged by further heating. Similarly, if pure hydrogen selenide is heated, a mixture is finally produced containing the same three substances in equilibrium. It has been previously shown by M. Ditte, that for temperatures above 320° C. the same final system is reached, whether the initial system consist of hydrogen selenide or of a mixture of hydrogen and selenium. At temperatures below 320° C., however, M. Pelabon shows that this is not the case, two distinct curves being obtained, according as the compound of the mixture is used as the starting-point. These curves are those called by M. Duhem ("Traité elémentaire de Mécanique chimique") curves of "false equilibrium," and the hypothesis proposed by him for such systems, especially that part predicting the gradual coincidence of the curves with rise of temperature, is well borne out by the experiments of M. Pélabon.

A CONTRIBUTION to the fascinating problem of the direct production of electrical energy by the combination of carbon and oxygen, is made by Messrs. Liebenow and Strasser in the *Zeitschrift für Elektrochemie* for February 20. They have investigated the so-called Jacques cell, which consists essentially of rods of carbon and iron immersed in fused caustic alkali (see NATURE, vol. liv. pp. 298, 353.) The electrical behaviour of several metals towards fused caustic alkali was first studied. A normal electrode of mercury, covered with calomel, in contact with a solution of potassium chloride, was connected to the fused potash by means of a piece of pipe-stem moistened at one end by the potassium chloride solution, and dipping into the fused caustic potash at the other. The difference of potential between this normal electrode and an iron rod immersed in the fused alkali was then measured. For about forty minutes the potential difference remained almost constant, hydrogen being evolved from the iron, and the fused mass having a greenish colour; suddenly the colour of the melt changed to dark brown, this change being accompanied by a fall of temperature and by a large fall (about 1 volt) in the potential difference between the iron and the mercury; the dissolution of the iron also ceased. The new potential difference remains practically constant for any length of time. Similar phenomena were observed with nickel and silver. Only one value was found for the potential difference between carbon and fused alkali. The differences of potential between iron or carbon in fused caustic potash at about 500° C. and the normal mercury electrode were: active iron, −1·5 volts; passive iron, −0·38 volt; carbon, −1·32 to 1·12 volts. In accordance with these numbers, it is found that a cell consisting of carbon and iron dipping into fused caustic potash, has at first a very small negative electromotive force which rises suddenly, when the iron assumes the passive condition to about + 1 volt. The cell develops a very inconstant current, the iron being very rapidly polarised. This may be remedied to some extent by passing a current of air through the fused electrolyte.

AN interesting reaction of magnesium nitride is described in the current number of the *Berichte*, by E. Szarvasy. This substance readily reacts at the ordinary temperature with absolute methyl alcohol, a mixture of ammonia with trimethylamine being formed, about 40 per cent. of the nitrogen being found in the latter form. It appears that the methyl alcohol acts partly as water, and partly as a methoxy-compound, since the solid residue consists of magnesium hydroxymethylate $OH.Mg.OCH_3$, a white hygroscopic powder which is dissolved by acids with formation of a magnesium salt, methyl alcohol and water. When heated it is converted into magnesia, carbonic oxide, and hydrogen. It seems possible that this reaction may provide a convenient mode of preparation of the trialkylamines.

THE additions to the Zoological Society's Gardens during the past week include a Bonnet Monkey (*Macacus sinicus*, ♀) from India, presented by Mr. B. Dade; a Black-handed Spider Monkey (*Ateles geoffroyi*) from Central America, presented by Miss Radley; six Black-eared Marmosets (*Hapale penicillata*) from South-east Brazil, presented by Mr. John Russell; an Egyptian Jerboa (*Dipus ægyptius*) from Egypt, presented by the Hon. Mrs. Brett; two Blood-breasted Pigeons (*Phlogœnas luzonica*) from the Philippine Islands, two Barred Doves (*Geopelia striata*) from India, presented by Lady Edmonstone; an Upland Goose (*Chloephaga magellanica*), bred in England, presented by Mr. H. Birkbeck; a Black Wallaby (*Macropus ualabatus*, ♂) from New South Wales, presented by Mr. G. J. Manders; a Rough-scaled Lizard (*Zonurus cordylus*), two Cape Bucephalus (*Dispholidus typus*), a Hoary Snake (*Pseudaspis cana*), a Ring-hals Snake (*Sepedon hæmachates*) from South Africa, presented by Mr. J. E. Matcham: two Lataste's Frogs (*Rana latastii*) from Turin, presented by Count M. Peracci; two Himalayan Bears (*Ursus tibetanus*, jv.) from Eastern Asia, three Royal Pythons (*Python regius*) from West Africa, deposited; a Great-billed Rhea (*Rhea macrorhyncha*) from North-east Brazil, a Bauer's Broadtail (*Platycercus zonarius*), two Graceful Ground Doves (*Geopelia cuneata*), a Shielded Death Adder (*Notechis scutatus*) from Australia, two Dunlins (*Tringa alpina*), a Golden Plover (*Charadrius pluvialis*), British, purchased; a Hybrid Pheasant Antelope, ♀ (bred between *Tragelaphus gratus*, ♂, and *Tragelaphus spekii*, ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

THE ORBIT OF JUPITER'S FIFTH SATELLITE.—In the current number of the *Astronomischen Nachrichten* (No. 3403-4) Dr. Fritz Cohn gives a condensed account of an investigation he has undertaken with regard to the determination of the elements of the orbit of the fifth satellite of Jupiter. The observations used were those made by Barnard, with the 36-inch Lick refractor, from September 9, 1892; and by Herrn H. Struve, with the 30-inch refractor of the Pulkowa Observatory, from October 21, 1893. Fortunately for this investigation, the observations of Struve were very numerous at the opposition of 1894, when extraordinarily bad weather hindered Barnard from making many measures. Limiting ourselves to a simple statement of the results obtained by Dr. Cohn, we may say that the orbit of the fifth satellite lies nearly in the plane of Jupiter's equator, and is very nearly circular in form. Assuming a circular orbit, and finding the differences, observed minus calculated, he was led to the following values for the improvement of the elements, leaving out of account perturbations that arise from the sun and the other satellites, but which, in consequence of the smallness of the distance of the fifth satellite from the primary, are practically insignificant.

1893. *October* 30 9. *Greenwich M.T.*

$$du_\circ = +\,0^\circ{\cdot}107 \pm 0^\circ{\cdot}078$$
$$d(\Delta) = -\,0''{\cdot}124 \pm 0''{\cdot}036$$
$$e = 0{\cdot}00592 \pm 0{\cdot}00080$$
$$P_5 = 233^\circ\,32' \pm 6^\circ\,55'$$

The elements, as deduced from the first two years' improved values, were as follows:—

1892. *November* 1. *Greenwich M.T.*

$$u = 226^\circ{\cdot}40 \quad u - U = 344^\circ{\cdot}46 \quad n = 722^\circ{\cdot}63160$$
$$e = 0{\cdot}00501$$
$$P = 207^\circ{\cdot}2 \quad \partial P = 911^\circ{\cdot}7$$

The daily motion, n, corresponds to a period of revolution

11h. 57m. 22·6790s. ± 0·0145s.

This daily motion thus requires only the small correction of $-\,0^\circ{\cdot}00140$ to produce, according to Marth's ephemeris, the difference in the period of revolution of + 0·08s.

THE ELLIPTICITY OF THE DISC OF MARS.—In determining the ellipticity of a planet's disc by the more common methods, the error due to the position of the line joining the observer's eyes is liable to make an appreciable variation in the value deduced. By the use of a small prism in front of the eyepiece this error can be entirely eliminated, as in the case, say, of a double star, the line joining the two components, or in the case of a planet its diameter (equatorial or vertical) can be placed in any direction with regard to the vertical.

Using the Repsold heliometer, Prof. W. Schur has taken advantage of both this method and the favourable recent opposition of Mars to investigate the question of the form of this planet's disc.

The mean values for the oblateness ($a - b/a$) of the disc, where $2a$ and $2b$ are the equatorial and polar diameters respectively, as obtained from a series of observations made on December 2, 11, 16, 17, were as follows:—

1896	$2a$	$2b$	$\alpha = a - b/a$
Dec. 2	6″·265	6″·125	1 : 44·7
11	6·310	6·135	1 : 36·1
16	6·210	6·125	1 : 54·0
17	6·240	6·125	1 : 54·3

Taking the mean of these values, Prof. Schur finds for the oblateness of the disc a value of 1/47, the observations being freed as far as possible from all sources of observational error.

THE ROTATION OF VENUS.—Notwithstanding the persistence with which the planet Venus has been telescopically observed, the question of its period of rotation is still open. Schröter advocated a period of 23h. 21m., which was generally accepted until Schiaparelli, in 1890, stated that the time of rotation corresponded to that of revolution, namely, 225 days. Since that date M. Perrotin, Dr. Terby, M. Cerulli, and others have tended to strengthen Schiaparelli's work by endorsing his observations. On the other hand, Schröter was not alone; for M. Niesten, M. Trouvelot, and Mr. Brenner, have all deduced from their own observations that the period must be a short one, namely, about 24 hours. The question, therefore, being, so to speak, in the balance, Mr. Percival Lowell's communication to the current number of the *Astronomischen Nachrichten*, No. 3406. is of more than unusual interest. This observer has done so much for us in the case of the surface-markings of the planet Mars, that it seemed most probable that, turning his attention to Venus, we might have some definite results. Commencing observation on August 24, 1896, with the 24-inch refractor of his observatory, he found that the surface-markings were surprisingly distinct, but resembled lines rather than spots. "A large number of them, but by no means all, radiate like spokes from a certain centre." These lines look purely natural, and have not the artificial appearance of the Martian Canals.

From a great number of drawings made, a comparison showed that the rotation is such "as to keep the markings always in the same position with regard to the terminator." Thus Mr. Lowell's observations indicate that the rotation and orbital period of rotation must coincide, so that Schiaparelli's observations are again endorsed.

Other physical characteristics of the planet's surface, as observed at the Lowell Observatory, are as follows.

No clouds appear to temporarily obscure the surface details. The intense lustre of the disc is shared by all the markings, as if "a bright veil of some sort were drawn over the whole disc." This veil can be hardly anything but atmosphere; for measurements, as in the case of Mars, have given indications of twilight, and therefore of the presence of an atmosphere.

Further, Mr. Lowell states that there seems to be no evidence of polar caps. This observation does not well accord with those made by M. Trouvelot in 1877 and 1878. It will be remembered that this observer not only found very distinct markings which he termed the polar caps, but was able to describe some important details of a varying nature. In a former number of this journal (vol. xlvi. p. 468) it is stated that two of the most interesting features visible on the surface of Venus were the snow-caps at the extremities of the poles. These spots surpassed in brilliancy and importance all that M. Trouvelot had ever observed.

Lastly, Mr. Lowell has found that some markings become less distinct on nearing the central meridian. These changes vary considerably, and are found not to be a matter of obscuration. Since the positions of the markings had not moved relatively to the sun, the change could not have been intrinsic. Mr. Lowell suggests differences in the character of the rock or soil. The impression gained, on the whole, by Mr. Lowell, is that in the markings of Venus "we are looking down on a bare desert-like surface.'